

SFP-1GB-HD1-59U-20-AO

MSA and TAA 1000Base-CWDM HD1 SFP Transceiver (SMF, 1590nm LTx/HRx, 20km, LC, DOM)

Features

- INF-8074 and SFF-8472 Compliance
- Simplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



Applications

- 1x Fibre Channel
- Gigabit Ethernet over CWDM
- Access, Metro and Enterprise

Product Description

This MSA compliant SFP transceiver provides 1000Base-CWDM HD1 throughput up to 20km over single-mode fiber (SMF) at a bidirectional wavelength of 1590nm LTx/HRx via an LC connector. It can operate at temperatures between 0 and 70C. The listed reach has been determined using a link budget calculation and tested in a standard environment. Actual link distances achieved will be dependent upon the deployed environment. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")



CWDM Available Wavelengths

Wavelength	Min.	Typ.	Max.
27	1264.5	1271	1277.5
29	1284.5	1291	1297.5
31	1304.5	1311	1317.5
33	1324.5	1331	1337.5
35	1344.5	1351	1357.5
37	1364.5	1371	1377.5
39	1384.5	1391	1397.5
41	1404.5	1411	1417.5
43	1424.5	1431	1437.5
45	1444.5	1451	1457.5
47	1464.5	1471	1477.5
49	1484.5	1491	1497.5
51	1504.5	1511	1517.5
53	1524.5	1531	1537.5
55	1544.5	1551	1557.5
57	1564.5	1571	1577.5
59	1584.5	1591	1597.5
61	1604.5	1611	1617.5

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	+3.135	+3.30	+3.465	V	
Power Supply Current	Icc			500	mA	1
Power Supply Noise Rejection	PSNR			100	mVp-p	2
Operating Temperature	Tc	-40		+85	°C	3
Storage Temperature	Tstg	-40		+85	°C	4
Power Supply Storage	Vcc		< +4.0		V	
Ambient Humidity	AH	5		95	%	5

Notes:

1. Cooled type.
2. From 100Hz to 1MHz.
3. Case with airflow.
4. Ambient.

- Without dew.

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Data Rate		DRT	1.0625		1.25	Gbps	
Differential Input Voltage		VIN,pp	150		1000	mV	
Differential Input Impedance		ZIN	90	100	110	Ω	
Tx_Disable	Input_Low	VIL	0		0.8	V	1
	Input_High	VIH	2.0		3.465	V	
	Assert Time	tOFF			10	us	2
	Negate Time	tON			1	ms	3
Tx_Disable to Reset		treset	10			us	4
Time to Initialize_Cooled (Including Reset of Tx_Fault)		tInit_cooled			10	sec	5
Tx_Fault	Output_Low	VFOL	0		0.8	V	6
	Output_High	VFOH	2.0		Vcc+0.3	V	
Receiver							
Data Rate		DR	1.0625		1.25	Gbps	
Differential Output Voltage		VOUT	300		850	mV	-
Differential Output Impedance		ZOUT	90	100	110	Ω	-
Rx_LOS (Loss of Signal)	Output_Low	VLOSL	0		0.8	V	6
	Output_High	VLOSH	2		Vcc+0.3	V	
	Assert Time	tLOS-ON			100	us	7
	De-Assert Time	tLOS-OFF			100	us	8

Notes:

- LVTTTL, normal at low, high is shutdown (Poff).
- Assert time tOFF: high.
- Negate time tON: low.
- Tx_Disable to reset treset: high.
- Cooled version, for wavelength stabilization at worst-case (low & high temperatures).
- LVTTTL, low is normal.
- Assert time tLOS-ON: low → high.
- De-assert time tLOS-OFF: high → low.

Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Optical Transmit Power		Pf	-2.5		2.0	dBm	
Transmitter Disable (Off) Power		Poff			-35	dBm	2
Peak Wavelength		λ_P	λ_C -6.5 ~ λ_C -1.5			nm	1
Spectral Width		$\Delta\lambda$			1.0	nm	3
Side-Mode Suppression Ratio		SMSR	30			dB	
RIN ₁₂ OMA		RIN			-117	dB/Hz	
Dispersion Penalty		DP			1.5	dB	
Extinction Ratio		ER	8.2			dB	4
Eye Pattern Mask		IEEE802.3/2008 Section 3 Figure 38-2					
Receiver							
Optical Sensitivity		S			-26.5	dBm	5
Optical Overload		OL	2.0			dBm	5
Operating Wavelength		λ_o	λ_C +2.0 ~ λ_C +6.5			nm	1
Rx_LOS (Loss of Signal)	Assert	PA	-38.0			dBm	6
	De-Assert	PD			-26.5	dBm	
	Hysteresis	PA-PD	0.5	2.0	5.0	dB	
Receiver Reflectance					-27	dB	7
RSSI Calibration		RCAL	Internally Calibrated				

Notes:

1. CWDM, DFB-LD, $\lambda_C = 1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591, \text{ and } 1611\text{nm}$.
2. At Tx_Disable = high.
3. At -20dB.
4. At 1.25Gbps, PRBS 2⁷-1, Figure 1.
5. PRBS2⁷-1, BER1x10⁻¹², and ER=8.2dB.
6. Squelch function enabled.
7. At λ_O .

Pin Descriptions

Pin	Symbol	Name/Description	Plug Sequence	Notes
1	VeeT	Module Ground.	1	
2	Tx_Fault	Status Out.	3	
3	Tx_Disable	Control In.	3	
4	MOD_DEF(2)	Input/Output (SDA, I ² C Data).	3	
5	MOD_DEF(1)	Input/Output (SCL, I ² C Clock).	3	
6	MOD_DEF(0)	Indicates that the module is present. Grounded internally.	3	
7	Rate Select	Rate Select In. Not Used.	3	1
8	Rx_LOS	Status Out.	3	
9	VeeR	Module Ground.	3	
10	VeeR	Module Ground.	1	
11	VeeR	Module Ground.	1	
12	Rx_Data-	Data Out Negative.	3	
13	Rx_Data+	Data Out Positive.	3	
14	VeeR	Module Ground.	1	
15	Rx_Vcc	Power.	2	
16	Tx_Vcc	Power.	2	
17	VeeT	Module Ground.	1	
18	Tx_Data+	Data In Positive.	3	
19	Tx_Data-	Data In Negative.	3	
20	VeeT	Module Ground.	1	

Notes:

1. Internally pulled down with >51k Ω resistor.

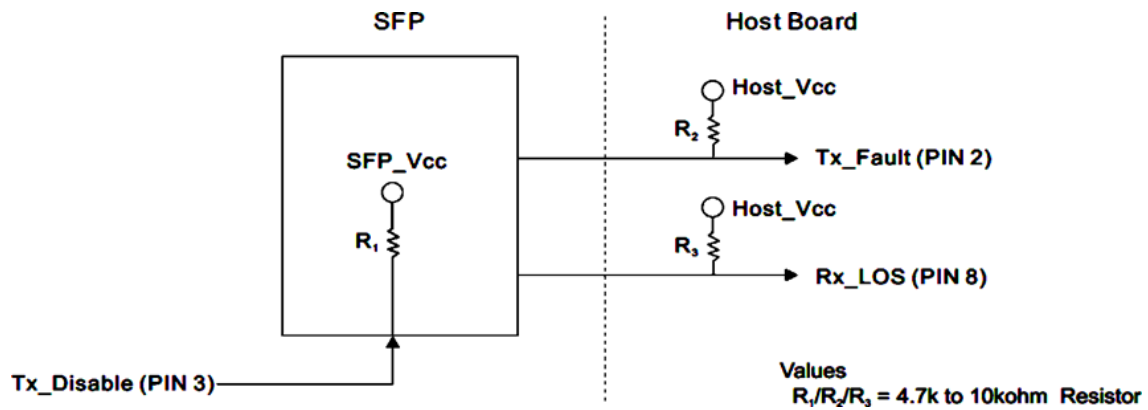
Recommended Circuit Schematic

Tx_Disable: Transmitter Disable, logic high, 4.7k to 10kΩ pull-up to the Vcc on the SFP.

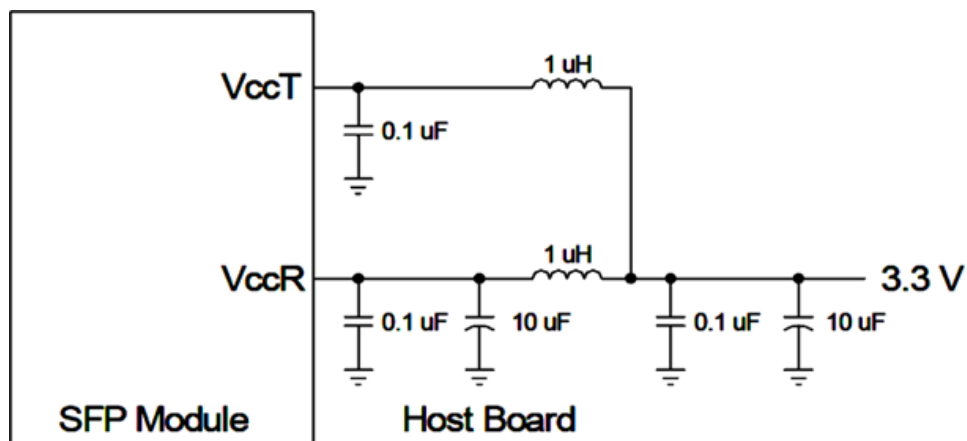
Tx_Fault: Transmitter Fault, logic high, 4.7k to 10kΩ pull-up to the Vcc on the host.

Rx_LOS: Receiver Loss of Signal, logic high, 4.7k to 10kΩ pull-up to the Vcc on the host.

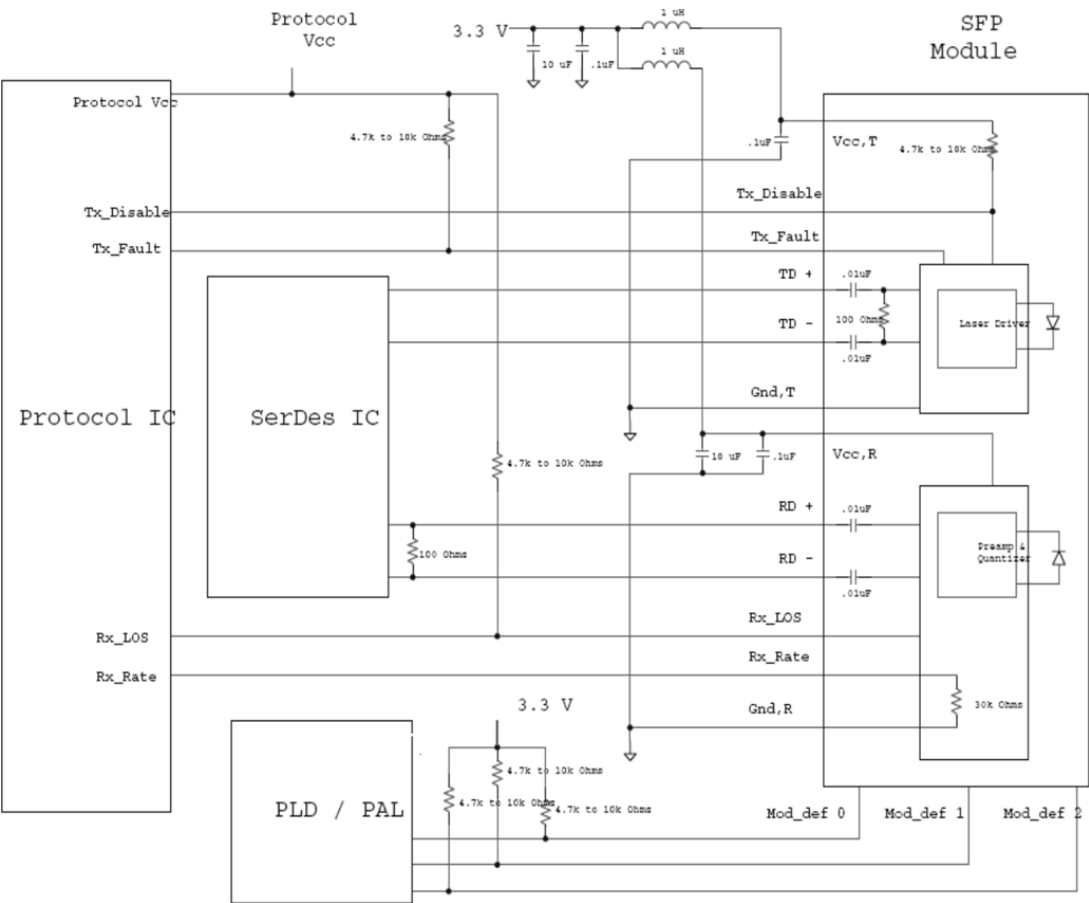
Signal Definitions



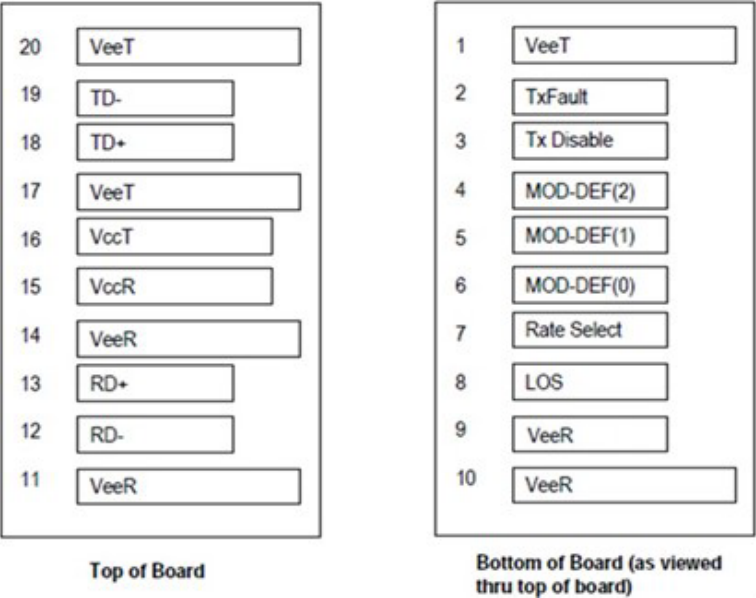
Power Coupling



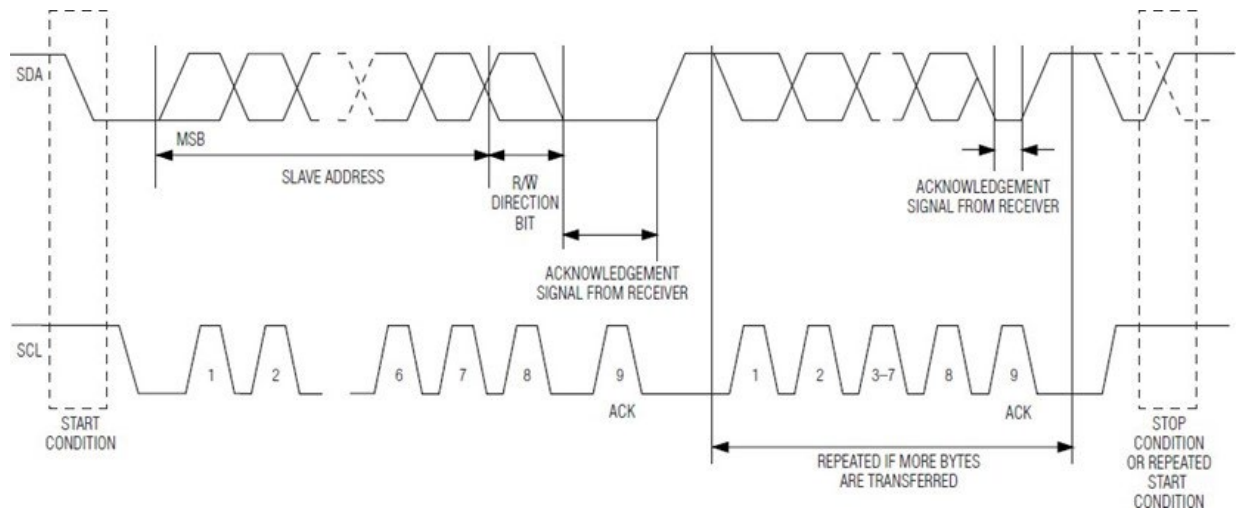
SFP Host Board Schematic



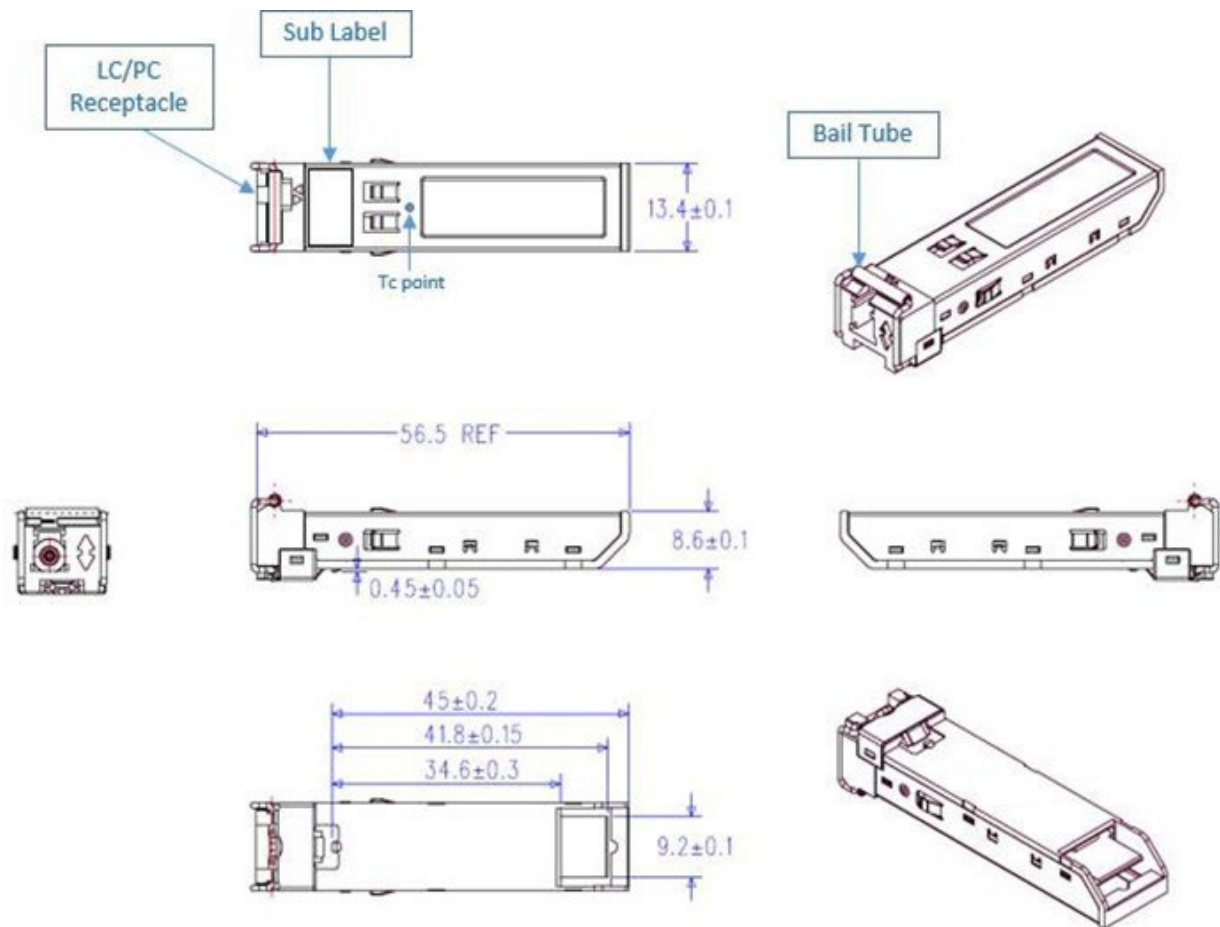
20-Pin Connector



2-Wire Data Transfer Protocol



Mechanical Specifications



About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



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